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Lindholst, Andrej Christian; Hjorth Caspersen, Ole; Konijnendijk van den Bosch, Cecil C

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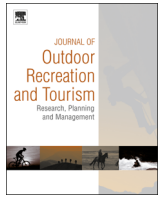
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# Methods for mapping recreational and social values in urban green spaces in the nordic countries and their comparative merits for urban planning

Andrej Christian Lindholst<sup>a,\*</sup>, Ole Hjorth Caspersen<sup>b</sup>, Cecil C. Konijnendijk van den Bosch<sup>b</sup>

<sup>a</sup> Aalborg University, Institute for Political Science, Centre for Organization, Management and Administration, Fibigerstræde 1, DK-9220 Aalborg East, Denmark

<sup>b</sup> University of Copenhagen, Institute of Geosciences and Natural Resource Management, Research Group on Socio-environmental Studies, Rolighedsvej 23, DK-1958 Frederiksberg C, Denmark

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## ABSTRACT

One of the challenges faced by urban planning is to identify and evaluate recreational and social values of urban and peri-urban green spaces. Over the past 30 years a number of methods for mapping recreational and social values have been developed and implemented in the Nordic countries, in dialogue between research and urban planning practice. This paper provides a framework for assessment of planning methods and an analysis of the comparative merits of seven Nordic mapping methods and how they address the challenges of identification and evaluation of recreational and social values. The assessment shows that challenges are addressed in complementary ways and are tailored to different planning purposes. There is also scope for further improvements of the link between research and planning.

## MANAGEMENT IMPLICATIONS

This paper provides a framework to compare and evaluate different tools for outdoor recreation planning in urban environments. Planners and managers may use this comparison to select a suitable approach for defining and mapping recreational and social values of urban and peri-urban green spaces. The paper distinguishes between three main methodological approaches: methods based on concepts rooted in perception of design, methods based on mapping experiences and methods focussing on social values.

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## 1. Introduction

Planning practice faces the challenges of how to assess questions of 'what is' and 'what ought to be', and how to bridge the two questions for achieving better place-based outcomes in urban green spaces and open spaces through intervention and action (Campbell, 2012; Friedmann, 1987; Smith, Pereira, Roe, Sosenko & Lindholst, 2014). These challenges apply equally to planning and management of urban green spaces, where the important role of spaces such as city parks or urban woodland as settings for recreational activities (i.e. leisure activities as part of people's daily or weekend routines) has been well recognized for more than a century (e.g. Clark, 2006; Bell & Petursson, 2010).

To address in particular the first question in critical challenge of

'what is', a range of recreational and social mapping methods has been developed over the last three decades in Europe, and the Nordic countries in particular. Here, method developments grounded in research which are aimed to support the provision of recreational opportunities in urban and peri-urban settings are seen as an important requirement for sound planning practice (Petersson-Forsberg, 2014). Nordic countries are highly urbanized and have well-developed outdoor recreation traditions (Hytönen, 1995; Hörnsten, 2000; Jensen, 1999). Most of Nordic cities tend to have greater proportions of green space compared cities in other parts of Europe (Fuller & Gaston, 2009). Consequently urban green spaces are among the most visited outdoor settings in the Nordic countries (Hörnsten, 2000; Jensen, 1999). Still, the high interest in and importance of outdoor recreation is not always matching actual planning practices and legislative frameworks (Petersson-Forsberg, 2014).

Method development in the Nordic countries in the last three decades has provided planning with an increased number of

\* Corresponding author.

E-mail addresses: [acl@dps.aau.dk](mailto:acl@dps.aau.dk) (A.C. Lindholst), [ohc@ign.ku.dk](mailto:ohc@ign.ku.dk) (O.H. Caspersen), [cck@ign.ku.dk](mailto:cck@ign.ku.dk) (C.C. Konijnendijk van den Bosch).

mapping methods grounded in both research and planning practice that conceptualizes recreational and social use, function, quality, and value of urban green spaces in combination with development of sound procedures for application within urban planning as well as daily management. These mapping methods use key concepts such as 'park properties' and 'park characters' (Berggren-Bärring & Grahn, 1995; Grahn & Sorte, 1985; Nordh, 2010), 'perceived sensory dimensions' (PSDs) (Grahn, Stigsdotter & Berggren-Bärring, 2005; Grahn & Stigsdotter, 2010), 'experience worlds' (Regionplane- och trafikkontoret, 2001, 2004), 'experiences classes' (Caspersen & Olafsson, 2006, 2010), and 'experience values' (Lindholst, Dempsey & Burton, 2013; Randrup, Schipperijn, Hansen, Jensen & Stigsdotter, 2008), 'social values' (Tyrväinen, Mäkinen, Schipperijn & Silvennoinen, 2004; Tyrväinen, Mäkinen & Schipperijn, 2007), and 'social use values' and 'sociotopes' (Stadsbyggnadskontoret, 2003; Ståhle, 2006). Together these concepts represent a group of mapping methods that span across several spatial scales from the individual urban green space or open space, to the regional level that integrates several urban centres in metropolitan areas. They all aim to provide planning practice with methods that allows for making inventories of physical characteristics, formal purposes or content of urban green spaces and open spaces combined with assessments of the recreational and social value(s) of these spaces. The key feature of the mapping methods is that they go beyond reliance on quantitative descriptions of physical characteristics or content as the primary information (e.g. the number of sports fields or the area covered by forests). In contrast to such 'shallow' information about the formal purpose or characteristics a 'deeper' understanding of urban green spaces about their 'worth' or 'benefit' for individuals or society may be gained by adding further information of the actual or potential value(s) of a given urban green space. By reference to the notion of 'value' these methods implicitly or explicitly provide frameworks for distinctions and judgement about 'good' and 'bad', 'better' or 'worse' which, according to Campbell (2002), resides in the heart of planning practice. The concept of value (of an object) is furthermore relative in the sense that it rest on subjective judgments while simultaneously relying on shared socio-cultural references in order to enable exchange and coherent interpretations between individuals (Simmel, 1900). What apparently is common for the mapping methods is their use of an informed framework, corresponding to a shared socio-cultural reference, based on research and/or agreement between actors in the planning system for identifying and evaluating ('judging') the recreational and social value of urban and peri-urban green spaces. Each method and its adoption in planning practice is therefore constitutive of the values it defines and promotes. Whether such adoptions are valid – or legitimate – may depend on the correspondence with political defined objectives, actual recreational use patterns or public preferences. Equally, partisan interest may distort the validity or legitimacy of such adoptions in planning practice (Lindholst, Sullivan, Konijnendijk van den Bosch & Fors, 2015).

Each of the mapping methods has been documented in the academic literature or in documents published by planning authorities. Although these methods are related to each other, so far no unified overview or comparative evaluation of them has been performed. This paper presents a comparative evaluation of the methods for mapping recreational and social values in urban green spaces in the Nordic countries, with the intent to contribute to both research and planning practice in at least four ways. First, the evaluation will provide a unified overview and comparison of method development. Secondly, it will provide guidance for selecting appropriate mapping methods for particular planning purposes. Third, the evaluation will identify needs and opportunities for further research and method developments. Fourth, the

review presents these mapping methods to an international audience.

The remainder of the paper is structured in the following parts. In Section 2, criteria for identifying mapping methods as well as a framework for evaluating the comparative merits of each mapping method are presented. In Section 3 each mapping method is reviewed separately. In the Section 4 the merits of the methods are compared and discussed before conclusions are presented in the final section.

## 2. Materials and methods

### 2.1. Material selection

The academic literature and planning authority documents were reviewed for mapping methods developed in dialogue between research and planning practice, and applied primarily within urban settings in the Nordic countries. Seven methods were identified as representing mapping methods that all aim for providing planning with an in-depth and proved reliable knowledge of recreational and social values by integrating key concepts and techniques that has been established within research. Methods merely relying on descriptions or inventories of physical features or the amount(s) of various types of urban (and peri-urban) green space as administratively defined by planning authorities or municipal park departments were not included. Inventories of the amount of various types of green spaces managed by municipalities are common throughout the Nordic countries (see e.g. Randrup & Persson (2009)).

### 2.2. Evaluative framework

The study's evaluative framework is based partly on themes which were applied in earlier comparisons of planning methods (McCool, Clark & Stankey, 2007; Nilsen & Taylor, 1997), partly on themes which are prevalent in mainstream planning theory (e.g. Campbell & Fainstein (2003) and Taylor (1998)) and finally on themes which emerged as important in our initial reviews of the seven mapping methods. Table 1 provides an overview of the indicators selected for the comparative analysis. The themes were used to guide our review and presentation of each mapping method.

Earlier assessments and comparisons of recreational planning methods identified several key themes that recreational planning methods can be evaluated against. Nilsen & Taylor (1997) compared US-based planning and management frameworks for protected nature and forest areas according to their 'origins', 'steps of the process', 'factors, indicators and standards', 'appropriate applications' as well as assessing their strengths and weaknesses. McCool et al. (2007) made a more open assessment of 'useful' frameworks for public land recreation planning made available in the US planning system from the 1970s and onward to the 2000s. McCool et al. (2007) discussed several aspects of these frameworks including principal planning questions, history and background, key concepts and variations, while also discussing strengths and weaknesses. These authors conclude that development of the frameworks has been more evolutionary than revolutionary and that their successful application has been a result of a close collaboration between managers and scientists.

Mainstream planning theory (e.g. Campbell & Fainstein (2003) and Taylor (1998)) comprises a range of key issues and themes with relevance for our analysis. Mapping methods under scrutiny mainly cover planning questions related to 'what is' questions, although they sometimes, by referring to normative connotations in concepts such as 'value', 'quality' or 'potential', implicitly also

**Table 1**  
Framework for evaluation of mapping methods.

Key themes	Key questions
<b>Country origin and time of introduction</b>	What was the time of development and introduction of the methods? In which country was the mapping method developed?
<b>Appropriate application (spatial scale, context)</b>	For which spatial scale, urban context and environment is the mapping method appropriate?
<b>Planning questions addressed</b>	Planning questions addressed: What are the principal questions with relevance for planning practice addressed by the mapping method?
<b>Concepts and indicators</b>	Which key concepts are involved? Which type of indicators is used for operationalizing concepts?
<b>Standards</b>	Does the mapping method involve a standard or benchmark for evaluating the quality of an urban green space?
<b>Mapping procedure</b>	Which procedural steps are involved in the application of the mapping method, including which data collection methods are involved? Which analytical procedures are involved in the mapping procedure?
<b>Output</b>	What type of principal output is produced by application of the mapping method?
<b>Inclusion of the public and/or users</b>	How does the method include the public and/or users in the mapping of recreational and social values?
<b>Integration in planning practice</b>	Where is the mapping methods used and adopted (e.g. in national policies or by municipalities, etc.)?
<b>Procedural paradigm</b>	Is the mapping method congruent with an expert / rationalistic planning paradigm or more oriented toward a deliberative/communicative planning paradigm?
<b>Urban paradigm</b>	Which conception of the urban environment and the role of urban green spaces underlie the mapping methods?
<b>Resource demands and requirements</b>	What organizational, technical and knowledge resources are required for implementing the method?
<b>Comparative merits</b>	What are comparative strength and weaknesses of each mapping method against other alternative methods?

reach out to cover planning questions related to what 'ought to be'. Planning theory has furthermore specified several paradigms that delineate coherent frameworks for understanding planning practice (Taylor, 1998). These include theories of both 'processes' as well as the 'object' or 'content' of planning. The distinction between 'rational' and 'communicative' planning is crucial in the (theoretical) understanding of planning processes while the object of planning in our case may be related to inherent visions of the urban environment. The vision typically relates to the role of green infrastructure in the development of Nordic cities. In the post-war era this development has been characterized by a change from a centralized urban structure based on an industrial economy to a polycentric urban structure in a globalized economy based on knowledge.

### 3. Review of mapping methods

Table 2 provides an overview and comparison of the seven mapping methods included in our review. In this section we present each method separately before turning to a discussion of key themes cutting across the methods.

#### 3.1. Park character analysis

Park character analysis (PCA) is a method for classifying and evaluating individual green spaces based on various pre-defined characteristics which taken together claim to represent the most important recreational functions and activities in an urban environment, including: 'rofylldhet' (quietness), 'vildhet' (wildness), 'artrikedom' (biodiversity), 'rymd' (space), 'allmänning' (commons), 'viste' (view), 'samvaro' (social), and 'kultur' (culture). With point of departure in earlier research reported by Grahn (1991) and Grahn & Sorte (1985) PCA was developed in the early 1990s by Berggren-Bärring & Grahn (1995) in an attempt to identify the most important characteristics and functions of recreational urban green-spaces according to the use by various segments of the population in Sweden. PCA initially operated with a range from 'untouched' and 'nature-oriented' characters to characters dominated by anthropocentric uses such as places for gathering and festivities, and culture (Grahn, 1991). This understanding was later refined in a cluster analysis of how characters were coexisting in urban green spaces (Berggren-Bärring & Grahn, 1995). The accumulated body of research on park characteristics has identified and confirmed what the most important recreational activities in

urban green spaces are as well as identified a typology of the corresponding characteristics of these green spaces. From a planning perspective the research has provided altogether eight important park characteristics that can be identified through visual inspection of physical features in an urban green space. Nordh (2010), with an applied planning perspective, refined the method further for practical use. PCA has especially been used in different cities by planning authorities in Sweden, creating a more diverse understanding of recreational experiences relating to the characteristics of urban green spaces. It was developed for use at park level and mapping procedures are based on expert-based observations of predefined characteristics. The method is field based and does not use indicators.

Especially in its early formulations, some aspects of the PCA strongly resemble the Recreation Opportunity Spectrum (ROS) developed in the United States during the 1970s. The system divides the possible recreational experiences into a spectrum of experiences that corresponds with different settings, one end of the spectrum deals with setting labelled as primitive proceeding towards more anthropocentric-dominated settings (Driver, Brown, Stankey & Gregorie, 1987).

In a more recent version of the PCA, Grahn et al. (2005) suggested that human's perception or experience of recreational qualities in urban green spaces can be captured by a range of 'experienced dimensions' or what Grahn & Stigsdotter (2010) later referred to as 'perceived sensory dimensions'. Following this suggestion the emphasis in PCA has changed from the correspondence between analytical categories and given physical characteristics to the importance of the experience emerging from sensory stimulated perceptions given in a physical environment.

#### 3.2. Health planning and design

In an analysis of survey data of Swedish town-dwellers' green space preferences and self-reported health status, Grahn & Stigsdotter (2010) found that some experienced dimensions of green spaces, defined as 'perceived sensory dimensions' which they labelled 'serenity', 'refuge' and 'nature' were positively correlated with the preferences of people who report a higher level of stress. This insight has been integrated into planning perspectives for promoting human health and well-being (Randrup et al., 2008) as well as in approaches to 'nature-based therapy' in protected and purposefully designed 'therapy gardens' (Stigsdotter et al., 2011). In an applied perspective, the method – which is strongly inspired by the PCA method – is intended for use at a local scale and is

**Table 2**  
Comparative overview of recreational and social mapping methods.

Method				
Themes	Park character analysis (PCA)	Health planning and design	Experience worlds	Experience classes (REC-mapping)
<b>Country origin and time of introduction</b>	Sweden, 1990s	Sweden/Denmark, 2010s	Sweden, 2000s	Denmark, Sweden, 2000s
<b>Appropriate application (spatial scale, context)</b>	Local/park level, urban	Park level, urban	Regional, peri-urban	Regional, urban and peri-urban
<b>Planning questions addressed</b>	'What is'	'What ought to be'	What is' and 'what could be'	What is' and 'what could be'
<b>Concepts and indicators</b>	'Park characters' or 'properties' indicated by set of physical characteristics	'Perceived sensory dimensions' indicated by description for interpretation of sensations	'Experience worlds' indicated by fixed set of indicators	'Experience classes' indicated by fixed set of indicators
<b>Inclusion of a standard</b>	Yes, more characteristics indicate higher quality green spaces	Yes, presence of dimensions associated with restorative properties	Yes, presence of all important experience worlds within region	Yes, presence of all important experience classes with region or urban area
<b>Mapping procedure</b>	Field-based by direct observation of predefined characteristics by experts	Design process. Expert driven	GIS-based analysis of available register data. Expert driven	GIS-based analysis of available register data. Expert driven
<b>Output</b>	Maps	Design proposal	Maps (GIS based)	Maps (GIS based)
<b>Inclusion of the public/users</b>	None	None	Initial, through focus group interviews or similar methods	Initial, through focus group interviews
<b>Integration in planning practice</b>	Used by several cities in Sweden	Experimental use in test gardens in Denmark, Sweden	Used in the Stockholm region	Used by Viborg and municipalities in greater Copenhagen area
<b>Procedural paradigm</b>	Rationalistic	Rationalistic	Rationalistic	Rationalistic or communicative
<b>Urban paradigm</b>	Industrial	Industrial	Industrial	Industrial, partly post-industrial
<b>Resource demands and requirements</b>	Low	High	High	High
<b>Comparative merits</b>	Long standing and widely known method. Well-defined set of characters rooted in traditional views of park and recreational spaces. Provides detailed information on individual parks.	Highly relevant perspective for planning practice but needs further development for practical application	Provide information across larger spatial scales (e.g. region or metropolitan area). Can be adapted with greater/fewer number of experiences	Provide information across larger spatial scales (e.g. region or metropolitan area). Can be adapted with greater/fewer number of experiences
<b>Method</b>				
<b>Themes</b>	<b>Small spatial scale experience mapping</b>		<b>Sociotope mapping</b>	<b>Social value mapping (SVM)</b>
<b>Country origin and time of introduction</b>	Denmark/Sweden, 2010s		Sweden, 2000s	Finland, 2000s
<b>Appropriate application (spatial scale, context)</b>	Park level, urban		City district level, urban	City level, urban
<b>Planning questions addressed</b>	'What is'		'What is' and 'what ought to be'	'What is'
<b>Concepts and indicators</b>	'Perceived sensory dimensions' indicated by description for interpretation of sensations		'Sociotopes' indicated by functions and inventories	'Social values' indicated by survey items
<b>Standards</b>	No explicit or implied standards		Optional. Can include explicit standards by set of predefined sociotopes within reach of urban population	No explicit standards
<b>Mapping procedure</b>	Interpretation based on perceptions/sensations (field based) by experts and/or professionals and users		Field observations and interviews/dialogue with users, triangulation by experts	Questionnaire to residents
<b>Output</b>	Maps (GIS based)		Maps (GIS based) and development plans	Maps and descriptive statistics
<b>Inclusion of the public/users</b>	Potentially as informants		Included as informants on use and preferences	Included as informants on use and preferences
<b>Integration in planning practice</b>	Some use in test trials in Denmark, Sweden. Also used by a few other municipalities, e.g. Vordingborg, Malmö		Used by City of Stockholm, City of Gothenburg	Recurrently used in Helsinki, Espoo, Vantaa and other Finnish cities
<b>Procedural paradigm</b>	Rationalistic		Communicative	Rationalistic
<b>Urban paradigm</b>	Industrial		Post-industrial	Industrial
<b>Resource demands and requirements</b>	Low		High	High
<b>Comparative merits</b>	Provides deep, detailed information on qualities of individual parks for particular management or planning purposes, but limited relevance for comparisons across parks or larger spatial scales		Provides planners and managers with sound assessment tool that also indicates the activities provided for residents and users.	Provides information across a city for individual parks in consistent and comparable way.



design oriented. The method, however, needs further development before it can be adopted in daily planning and management (Peschardt & Stigsdotter, 2013).

### 3.3. Experience worlds

Approaches rooted in a concept of so-called 'experience worlds' and subsequently 'experience classes' have also evolved from PCA which is feasible for smaller green spaces, but does not comply with the specific demands that relate to larger regional scales, i.e. limits on field work, type, use of indicators, and so forth. In the early 2000s, the Stockholm Regional Authority (Regionplane- och Trafikkontoret, 2001, 2004) produced a set of GIS-based maps of recreational experiences and social values for the green wedges in the greater Stockholm area. The eight classes of the PCA were reduced to seven and validated through interviews with various user groups, while quantitative indicators were formulated.

The method links an understanding of peoples' 'experience world', developed through qualitative research, with seven landscape types: (1) 'untouched and fairy tale environments', (2) 'forests feeling', (3) 'panoramic views and open landscapes', (4) 'variation and nature pedagogic', (5) 'culture and living landscape', (6) 'activities and outdoor life', and (7) 'social life'. Landscape types were subsequently identified through the use of different 'objective' parameters and register based data sources. The method is based on the use of GIS and register-based indicators and is very cost-efficient. The drawback is that more detailed information often will be necessary for planning at the local level. Later additions of more rigorous survey methods and statistical analysis for identifying important public preferences for recreational activities and uses have reduced number the number of experience worlds to four (Boverket, 2007). The main outcome is the provision of information about social life and recreational quality. The experience-world perspective has later inspired research efforts to adapt the method for addressing planning needs for providing nature recreation in urban areas characterized by tendencies to sprawl and densification (Ståhle & Caballero, 2010).

### 3.4. Experience classes

The early method development in Sweden provided inspiration to later method development in Denmark and the Greater Copenhagen area in particular, including the Danish 'Recreation Experience Mapping' (or REC-mapping) method by Caspersen & Olafsson (2006, 2010). Fig. 1 provides a graphical interpretation and representation of the seven experience classes.

The method is GIS-based and includes detailed information on land use, land cover and noise exposure. For each class a number of indicators are defined through different parameters. The definition of GIS-based indicators enables a regional mapping procedure while still maintaining a very high level of detail within each class. The procedure has been applied for the enlargement of the existing green wedges in Greater Copenhagen. It firstly focused on existing wedges which were investigated in order to evaluate the demand for further development. Next, the forthcoming enlargement areas were analysed in order to determine their recreation potential. The result of the mapping procedure was implemented in the regional planning procedure for the new green areas and afterwards handed over to the 28 municipalities in the region. Seven of these municipalities have established a network for the green wedge development in the western part of the city and continued development of the method. This resulted in the adding of two new experiences classes in order to emphasize landscape elements that characterize green areas in highly urbanized landscapes (Vestegnssamarbejdet, 2011). The method is quite similar to the Swedish experience worlds' method but due to the higher

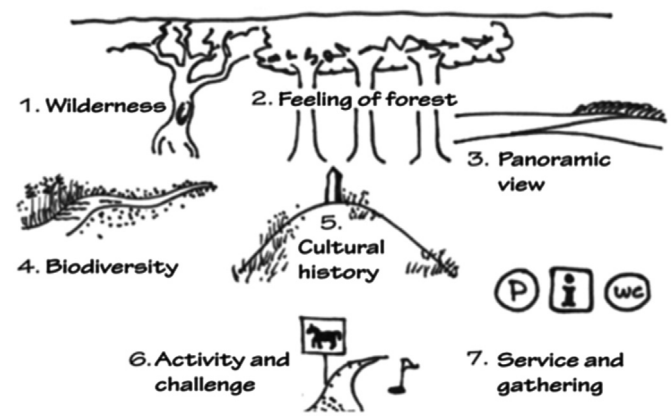


Fig. 1. Graphical interpretation of the seven experience classes (illustrated by Birgitte Strunge, Viborg Municipality, Denmark).

resolution data and a different analytic use of GIS it can provide information on an even larger scale. An advantage is the inclusion of noise information (Nordh, 2000; Tarrero, Martin, Gonzales, Machimbarrena & Jacobsen, 2007). The method is expert-based and investigations have indicated that some classes (historical experiences and ecological experiences) often are difficult to detect for visitors in the designated areas (Olafsson, 2012). In the various applications (e.g. Copenhagen and Stockholm) the general classes and their operationalization have been tailored to the particular planning context.

### 3.5. Recreational experience mapping at small spatial scales

Lindholst, Nuppenau & Hune, (2010) and Lindholst et al. (2013) discussed and suggested a mapping method based on identification and analysis of recreational experiences within smaller spatial scales (i.e. large scale maps). The method utilizes the framework for conceptualizing recreational experiences as a set of 'perceived sensory dimensions' presented by Grahn & Stigsdotter (2010) and initial methods and suggestions for application presented by Randrup et al. (2008) and Schipperijn (2010). Experiences are 'mapped' systematically through on-site analysis by experts. The presence and strength of various experiences are interpreted through both sensation of the particular space and the use of background information. This is done with the aim to obtain information about the broader recreational qualities and potentials of an urban green-space. In the analysis of an urban green space, experiences (and zones) may overlap, create multidimensional spaces of experiences, be identified at different spatial scales, or be associated with particular pre-defined areas. In the development, Lindholst et al. (2010) and Lindholst et al. (2013) suggested that the method needs to be tailored to an understanding of purpose and context. To address this, a range of issues related to specification of the particular planning situation should be taken into account as part of the mapping exercise. These include planning objectives and context, adoption of procedure for mapping, assessment of preferences, use, and needs, scope for development and action, and a plan for communication/use of information. Additionally Lindholst et al. (2013) found, when testing this method in UK, that independent mapping of nuisances would be beneficial to include for practical planning purposes.

The method provides a deeper understanding of a space's recreational potentials and qualities but may be less suited for comparisons and overviews across several urban green spaces within a larger district or region. Variants of the method have been adopted and applied by Vordingborg municipality, Denmark and

Malmö municipality, Sweden. In these applications the initial eight experiences have been reduced and altered by planning authorities to a fewer number of experiences in order to provide a more simple and easy framework for management.

### 3.6. Sociotope mapping

During a period of urban densification in the Stockholm region, Sweden, the 'sociotope analysis' and the 'sociotope map' were developed for identifying 'social use values' of urban open spaces (Stadsbyggnadskontoret, 2003; Ståhle, 2006). The method focuses on "commonly perceived direct use value of a place by a specific culture of group" (Ståhle, 2006, p. 60) and involves creation of 'sociotope maps' that locate places of social use value in open spaces. The full method involves five steps: (1) open space definition, (2) expert evaluation of important uses, (3) user evaluation of important uses, (4) synthesis of evaluations, and (5) mapping of sociotopes for particular spaces. The mapping procedure departs with a simple question to informants about where their 'favourite spots' are in the local neighbourhood. The Stockholm work identified altogether 20 social use values such as 'play', 'quietness', 'walking', 'wilderness' or 'swimming' (Ståhle, 2006). Sociotope maps have subsequently been developed by other major Swedish cities. Planning authorities in Gothenburg, for example, have integrated sociotope maps (comprising 20 slightly different sociotopes) in their park policies and strategic planning setup for long-term management of public parks and open spaces. Since 2005, the city has systematically produced maps of the location of sociotopes in each of its city districts similar to the map presented in Fig. 2 (Lindholm, 2011; Petersson & Sonntag, 2010). The maps address the central planning question of 'what is' by providing planners, decision-makers and the public with uniform information about which types of sociotopes which are found within various types of areas in a city district. However, the maps also link planning practice with the question of 'what ought to be' by treating existing sociotopes as important open space values that needs to be protected in (or from) urban development.

The method designates specific sociotopes within an area. It involves both expert and user involvement and assessment and is based on on-site evaluation. Due to the intensive field work it is rather labour intensive when implemented in at larger spatial scale.

Although Ståhle (2006) regards sociotope mapping as a part of a 'communicative turn' in urban planning (stressing dialogue and citizen participation), the maps themselves seem difficult to comprehend by non-experts such as users and politicians. It is, for example, difficult to compare the overall quality of different areas by the reading of a sociotope map and areas indicated as similar on the map may be very different when visited. Sociotope mapping may also miss where non-used spaces with a recreational potential are located due to its focus on 'favourite sites'. The procedure for mapping of recreational experience on smaller scales addresses these issues in some degree, although the trade-off is a loss in comparisons across different urban green spaces. However, in theory there is no reason why sociotope maps cannot be drawn up in different ways for different purposes (Ståhle, 2006).

### 3.7. Social values

In Finland, Tyrväinen et al. (2004, 2007) developed 'social value mapping' (SVM) for mapping the social values of urban woodland and other green spaces with similar objectives as in sociotope mapping. SVM is based on administration of questionnaires to residents and registration in GIS of responses. Initial development of SVM was done in Helsinki within a European research project on socially inclusive planning and management of urban woodland (e.g. Janse & Konijnendijk, 2007). Tyrväinen and colleagues found that the most

frequently identified positive values with respect to green areas were 'opportunities for activity', and 'beautiful landscape'. Also rated highly were 'freedom and space', 'a feeling of forest' and 'peace and quiet'. In the development Tyrväinen et al. (2007) also suggested and mapped three important negative experiences ('scariness', 'unpleasantness' and 'noise'). This contrasts to the other methods included in this review that mainly focus on positive characteristics associated with recreational activities.

SVM, found to be useful to Helsinki, was also implemented in other major Finnish cities. Compared to the other methods, such as REC-mapping, SVM is relatively time-consuming due to the combination of a questionnaire followed by a GIS-based mapping procedure. It benefits, however, from the inclusion of the users and by mapping of their preference and sensations.

## 4. Discussion and comparative perspectives

### 4.1. Linkages between methods – three families

All methods have their conceptual and/or methodological origins in Sweden and most have subsequently been adapted to other Nordic countries. For early developments in the Nordic countries we identified inspiration from the ROS planning framework originating in the USA in the 1970s.

Several of the methods share similarities in conceptual grounding and/or methodology for application. Some are innately interconnected through explicit acknowledgement and reference in particular to the applied conceptual framework while others are more remotely interconnected through similarities in applied methods, spatial scale or other characteristics.

Fig. 3 provides an overview of the methods and their location within three main 'families' based on the similarities of their underlying concept: The first family comprises of methods based on concepts rooted in 'perception of design', including the PCA, Health Design and Planning and Experience mapping at small spatial scales. The second family includes methods based concepts rooted in 'experience' including on experience classes and experience worlds, and the third family comprises of methods rooted in social meaning and use including sociotope mapping and social value mapping.

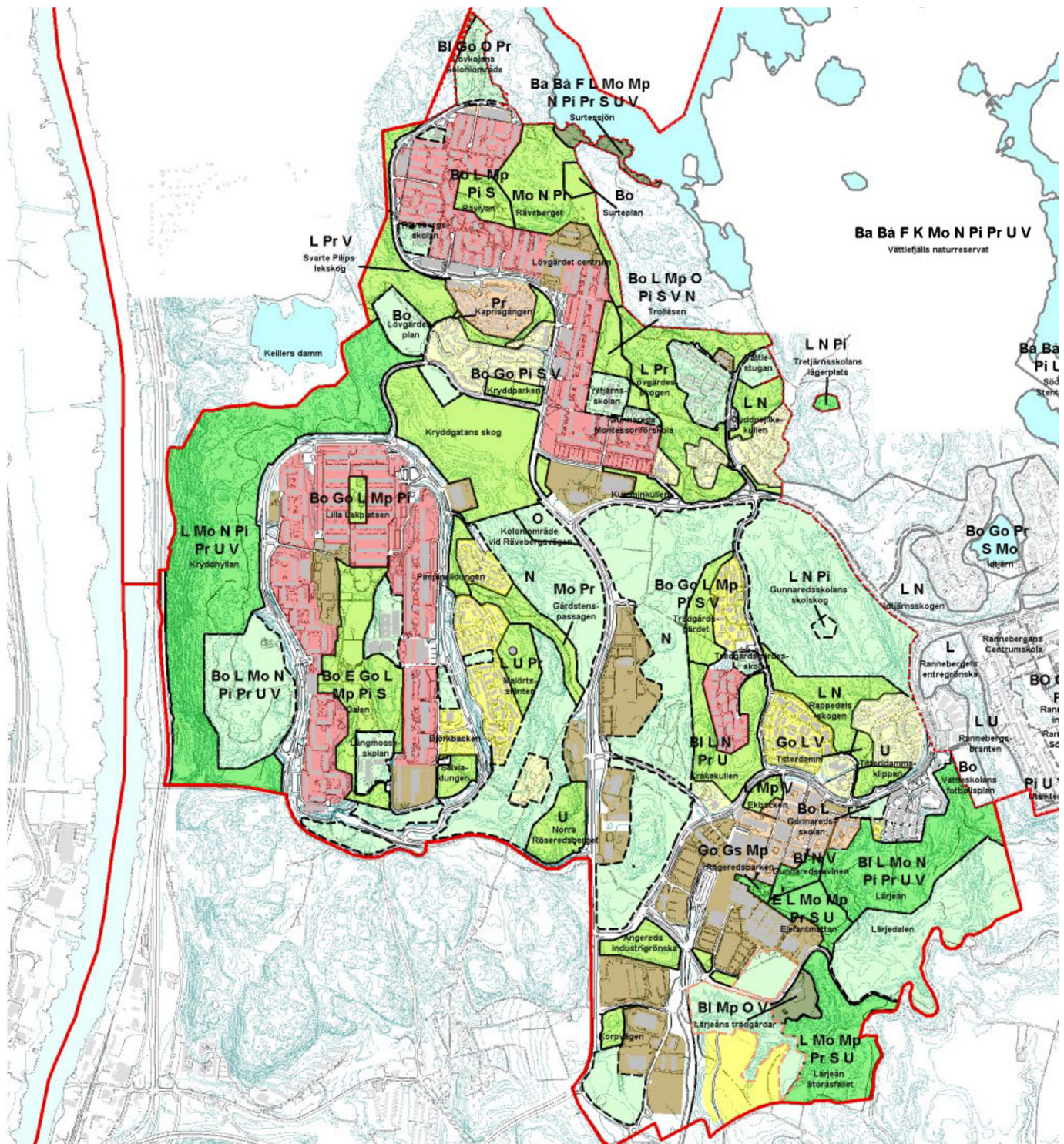
Obviously the different methods do not always fit 'neatly' into their family, as linkages between the different families exist. Nonetheless an affiliation of the methods to the underlying concept can be identified. For example the mapping of experience worlds and experience classes is linked directly through their use of indicators and parameters within each of the experience classes, while the link to PCA is weaker and more conceptual in its character due to the focus on valuation. Likewise, there is a difference in scale: PCA is designed for use on a local scale while the other two methods in the family mainly operate on a regional level.

Other differences relate to the implementation and transnational use. Sociotope mapping has not been applied outside of Sweden, while PCA has been used in Sweden, Denmark and Norway. Since the late 2000s, the linkage to health planning and design has been developed further and the concept of designing parks based on PCA has been tested in both Denmark and Sweden in relation to design of park and gardens for therapeutic use

### 4.2. Conceptualization of recreational and social values

The conceptualization of recreational and social values differs between the methods and may cause some confusion for planning practice. PCA and sociotope mapping, for example, represent two opposites in the conceptualizations of values within the reviewed methods. In contrast to PCA, sociotope mapping is in principle





**Fig. 2.** Sociotope map of the city district of Vest Gunnared, Gothenburg, Sweden. Colour codes indicate area types (e.g. housing, forest, park, etc.). Abbreviations indicate which type of sociotopes that are found within an area. Source: City of Gothenburg. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

completely open for planning to define what is – or should be – valued within a particular context. In addition, personal, social, cultural, and geographical differences are also highlighted as influential within the literature (Bourassa, 1990; Herzog, 1992; Home, Bauer & Hunziker, 2010; Purcell, Lamb, Mainardi-Peron & Falchero, 1994; Van den Berg & van Winsum-Westra, 2010; Van den Berg, Vlek & Coeterier, 1998). Individual as well as general public preferences (e.g. stated in official policies or regulatory

frameworks) for recreational experiences are therefore likely to differ across personal, social, cultural, and national boundaries. The influx of context implies that one's experience is partially influenced and learnt through socialization and shared information – or what Faehnle, Bäcklund, & Tyrväinen (2011) call 'intersubjective action', and is context-dependent. The importance of the values and cognitive categories (i.e. the dimensions of the recreational experience) within the frameworks should therefore



be expected to differ across boundaries and contexts. Thus experiences in a Swedish context may not be equally valid to the same extent in a Danish or Finnish context – and not in the least outside the Nordic countries. The influx of context on values and cognitive categories also explains, for example, why a Danish version of experience worlds including a different set of indicators was adapted instead of a one-to-one application of the methodology developed for the Stockholm region.

#### 4.3. Standards and their assessment

Four of the reviewed methods, including PCA, Health Design and Planning, Experience Worlds and Rec-mapping, incorporated standards for spaces of high quality or value as well as procedures for either qualitative or quantitative types of assessment. Three of these four methods furthermore applied a standard which relied on a 'more is better' assumption (quantitative oriented assessment). Method development within the conceptual framework of perceived sensory dimensions by [Randrup et al. \(2008\)](#), for example, applied a highly formalized and expert-based procedure with the aim to achieve a high degree of quantification as a measurement of an urban green-space's recreational value calculated as a total aggregated score. [Schipperijn \(2010\)](#), however, tested this approach against the perceived attractiveness of green spaces across an inner-city district and found no statistical evidence that higher aggregate scores correspond to more attractive urban green spaces in the eyes of the users. Such research highlights some limitations for the degree of quantification. Experiences do not simply 'add up' by rendering, for example, the value of two medium experiences similar to the value of one full. Each experience may therefore in itself better be viewed as unique with no innate ranking order in their potential worth and use value. On the other hand, representation of an experienced space within planning necessarily implies per se a certain level of reductionism (or degree of quantification). [Grahn & Stigsdotter \(2010\)](#) found that, from a health perspective some (combinations of) experiences are more valuable than others. Given this planning dilemma, [Stähle \(2006\)](#) highlighted the challenge to produce a practically useable method of representation but still meaningful and supportive for social practices (actual use).

#### 4.4. User involvement

User involvement provides another theme for method comparison. Users are mostly specified in the role as 'informants' or 'respondents' in the reviewed methods. In SVM, for example, surveys were carried out to provide information on user preferences. In the application of sociotope mapping in Gothenburg, interviews with school children have been carried out for mapping the location and use of sociotopes in local districts. In Stockholm,

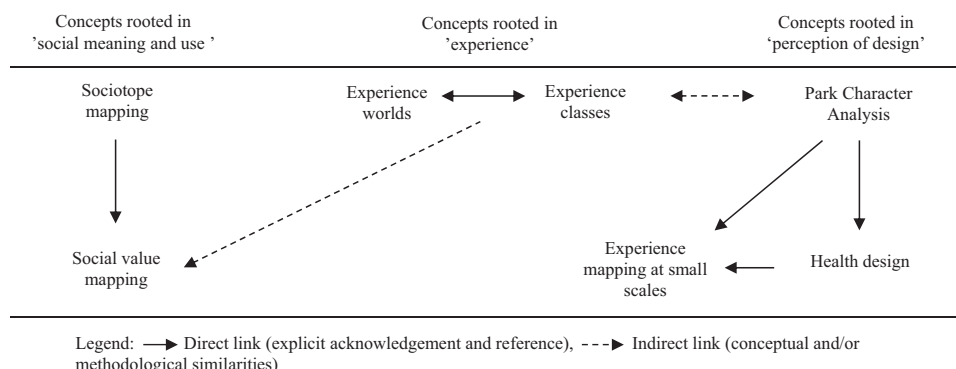
several focus groups were interviewed to define the different experience classes and the indicators. More inclusive, dialogue-based approaches have not been applied in any of the methods but several methods have the potential to provide input for dialogue and interactions between users and professionals. Inspiration for further development may be obtained from outside the urban zone, where some attempts has been made to link research with user involvement ([Caspersen, 2009](#)).

Most of the methods are furthermore congruent with a rationalistic paradigm where 'experts' and 'professionals' are main actors in the mapping of the 'what is' through their role in assessing the values of urban green spaces without active involvement of users. This is true, for example, for PCA and the method relying on the framework of experience worlds. The communicative turn with its focus on involvement and decentralization of decision is only developed and integrated in few of the research-based mapping methods – in particular in sociotope mapping. User involvement does not feature strongly in the methods for mapping the values of urban green spaces and open spaces. Given the need for further use involvement in planning in the Nordic countries ([Petersson-Forsberg, 2014](#)) our review indicates that this aspect should be given greater attention in future method developments.

#### 4.5. Performance compared

[Table 3](#) provides a comparative assessment of the performance of the seven mapping methods. The methods differ in their usefulness for local and regional planning needs. Their usefulness for planning relates to whether the method delivers information about 'what is' in a reliable and applicable way for decision-making at the two levels. Only few of the methods, PCA and sociotope mapping in particular, meet planning needs at both planning levels.

The methods' performance also differs in terms of contextual adaption, public involvement and reliance on management knowledge/techniques. Most of the methods are less flexible for adaption to particular context due to a high degree of reliance of predefined recreational and social values. PCA relies, for example, on a completely fixed set of values based on physical characteristics. The mapping procedure in PCA is furthermore relying on physical inspection in an area and therefore it is relative burdensome to apply across a region compared to mapping methods relying on register data, such as REC-mapping or experience worlds. Only sociotope mapping and SVM are, in principle, highly adaptable to particular planning and urban context due to openness in specification of values and how they are mapped. Applications in planning practice may adopt a more fixed set of values and mapping procedures in order to provide a manageable mapping framework within a larger urban area. As discussed earlier, the level of public involvement differs across the mapping



**Fig. 3.** Relationships between seven research-based recreational planning methods in the Nordic countries.

methods. SVM and sociotope mapping rely heavily on public involvement in their mapping procedures, however, mainly by means of informants in focus groups (sociotope) or surveys (SVM). Most of the methods require intensive use of professional knowledge and techniques. The mapping methods based on experience worlds and classes, for example, require use of GIS and a range of different data sources. Requirements for professional knowledge and techniques also render these methods expensive and resource-demanding to apply. Only PCA and experience mapping at small spatial scales are relatively undemanding and uncostly to apply. However, application of PCA across a regional area will demand allocation of more organizational resources for mapping all local areas in a uniform and comparable approach.

#### 4.6. Research and planning practice

The link between research and planning practice may be discussed at three levels. At a conceptual level, research can support planning practice by providing information on vital recreational and social values through concepts and terminologies. At a policy level, methods can integrate research and practice at the level of arguments and knowledge in support of specific planning policies. At an applied level research can support planning practice by providing guidelines, step-by-step prescriptions and practical procedures.

At policy and applied level there is a lack of adoption and application in Nordic planning practice. For example, among the many methods for measuring the human experience of (urban, rural and natural) landscapes applied in research (Lindström & Jönsson, 2009) only few seem to have found their way into urban recreational planning practice or legislative and policy frameworks in the Nordic countries (Petersson-Forsberg, 2014). Within this institutional void implementation of methods is taking place autonomously or arbitrarily by authorities at the more decentralized levels of the state.

The presented material does not allow for a firm conclusion on why planning practice does not engage in adoption to a greater extent or more systematically in mapping methods with a knowledge-base in research. However, McCool et al. (2007, p. 27–30) discuss a range of conditions they see as critical for adoption of recreational planning frameworks by public authorities. These include organizational will, technical capacity, inclusiveness regarding different values and systems of knowledge, open and deliberative processes, a focus on effectiveness of planning rather than low costs, and finally the presence of system thinking that considers relationships across time, space and functions. Conditions may be used to identify deficits in planning systems' (and

public agencies') overall capacity for engaging in sound planning practices, raising critical questions for development of the capacity of planning systems and the various agencies that carry out planning in practice.

Furthermore, while in research 'rigour' is often emphasized and addressed by scientific criteria for validity and reliability in order to ensure a sound knowledge-base, planning practice is, on the other hand, manoeuvring in a political and administrative context with a very different logic than scientific criteria prescribe. Often there is a need to provide fast and simple (i.e. easily comprehensible) information that can be used in decision making by actors with various interests, power and knowledge. The influx of politics at the policy level in planning practice may also impede or supersede 'rationality' in pursue of partisan interests (Flyvbjerg, 1998; Lindholst et al., 2015).

#### 4.7. Nordic methods in an international context

Interaction between the Nordic methods and methods developments elsewhere seems to be a two-way street. Firstly, what can Nordic methods contribute within a broader context? The Nordic methods are embedded in a long history of outdoor recreational research and over thirty years of continued development on assessing the social and experience values of urban green spaces, as well as various applications of this track record within planning practice. Research needs set out by James et al. (2009) especially on 'experience' and 'management' also indicate where the Nordic set of methods has its merits; the methods are combining research insights and practical experiences with application in planning practice related to both the theme of experience and the theme of management.

Secondly, what inspiration has the international context provided for the development within the Nordic countries? Inspiration from ROS indicates that methods from abroad strongly have spurred Nordic developments in the past. Methods from abroad may also inspire future research and planning method developments. One example is the UK tradition for systematic user involvement where lessons can be learnt for enhancing methods by active user involvement. This includes the methodology embedded in Spaceshaper (CABE Space, 2007) as well as the experiential landscape method developed by Thwaites & Simkins (2006). Spaceshaper is mainly rooted in a common usage methodology rather than theory and research-based concepts and encompasses a tested method that can facilitate interaction between users, various professional groups and experts with an outset in particular areas and surroundings. The experiential landscape method is on the other hand rooted in research and deals with human

**Table 3**

Comparative assessment of the applied performance of recreational and social mapping methods.

Mapping method	Key performance dimension*				
	Local planning	Regional planning	Contextual adaption	Public involvement	Reliance on professional knowledge/ technique(s)
Park character analysis (PCA)	**	**	*	*	**
Health planning and design	***	*	*	*	***
Experience world	*	***	**	*	***
Experience classes (REC-mapping)	**	*	**	*	***
Small spatial scale experience mapping	***	*	**	**	*
Sociotope mapping	***	***	***	***	***
Social Value mapping (SVM)	*	***	**	***	**

\*Comparative assessment of key performance dimension.

\* Limited performance.

\*\* Reasonable performance.

\*\*\* Good performance.

'experience of space' in urban settings. It presents itself as a more generic planning method when compared to the Nordic range of methods. The method is here directly occupied with questions related to 'what ought to be' rather than the occupation with 'what is' found in most of the Nordic methods. The method also describes a range of interactive methods that can facilitate interaction beyond mere preference measurements. Solely focusing on preferences does not allow users to develop new visions and understandings that can guide the full planning circle.

## 5. Conclusions

Since the 1980s, a range of research-based, distinct recreational mapping methods have been developed and applied for planning and management purposes in the Nordic countries. This review included more or less interconnected research and planning efforts originating in the Nordic countries that all point at the importance of going beyond everyday language, professional technical/horticultural standards, as well as mere physical quantification and descriptions of urban green space. The analysis provided (1) a unified overview and comparison of method developments, (2) guidance for selecting appropriate mapping methods for particular planning purposes and for particular context(s), (3) identified needs and opportunities for further research and method developments and (4) introduced the mapping methods to an international audience, enabling comparisons with methods found elsewhere in the world.

Discussion and comparison of the methods calls for more research. Decision-makers, for example, may settle on methods that rely on quantifications of space and 'hard' figures. Methods that provide indicators for the distance to the nearest green space (e.g. living within 300 m from the nearest green space) or account for quantities of green space per capita are examples on such methods. But this provides a rather unbalanced focus on 'amounts' and 'figures' rather than integrating a deeper perspective on the value or 'quality' of urban green spaces. Methods based on inventories of physical features simply say too little about the quality of green spaces. The development of the different methods described in this paper shows that careful adopted and context-sensitive perspectives are needed if we want to understand how people's experiences and preferences can be better accounted for as well as accommodated in planning practice. The methods, accordingly, provide planning practice with informed frameworks for making judgements about what is 'better' or 'worse' in ways where the decisive values are explicated and open for deliberations in planning practice and in research. The concerted merits of the Nordic range of mapping methods and the Nordic experiences to date, based on international inspiration and mutual learning, can provide part of the base for further deliberation and development.

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